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NATURAL CONTROL OF THE GREY BANDED LEAF ROLLER, EULIA MARIANA FERN, IN NOVA SCOTIA ORCHARDS.

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Eulia mariana Fern. was identified in Annapolis Valley orchards about twelve years ago and since has become one of the major orchard pests. Although outbreaks continue to occur, fruit growers should fully appreciate the value of natural control, which in one form or another is always assisting in keeping this insect in check. The various natural control factors may be recorded as follows:

(1) Mortality of pupae. (2) Parasites of larvae and pupae. (3) Parasites of eggs. (4) Predators.

PUPAL MORTALITY

There was a mortality of 32 percent of the pupae during the winter of 1935-36 in orchards at Somerset, Kings Co., and Round Hill, Annapolis Co. Of this mortality, parasites were responsible for approximately 3 percent and predators 21 percent. The remainder were more or less mummified and usually full of moulds. It is quite possible that fungi attacked these pupae.

PARASITES OF LARVAE AND PUPAE

Beginning when the larvae were from one-third to one-half grown collections were made every two weeks from four widely scattered orchards. These larvae were reared at the insectary until pupation occurred. From the larvae thus reared, supplemented by large numbers of pupae collected in the field, the following species of parasites were obtained:

TABLE I

Parasites obtained from *Eulia mariana* Fern., in Nova Scotia, 1935-36.

Location	*Species*	*Order*
Round Hill.	*Ephialtes* (*Ephialtes*) *tenuicornis* Cress.	Hymen.
" "	*Glypta* Sp. (May be *erratica* Cr.)	"
" "	*Apechthis ontario* Cress.	"
" "	*Glypta* Sp. (distinct from above genus)	"
" "	*Zenillia blanda* O. S.	Diptera
Berwick	*Phytodietus annulatus* Prov.	Hymen.
"	*Atrometus* Sp.	"
Waterville	*Glypta* Sp. (may be *erratica* Cr.)	"
"	*Ephialtes* (*Itoplectis*) *leavitti* Cush.	"
"	*Glypta* Sp.	"
"	*Ephialtes* (*Itoplectis*) *conquisitor* Say.	"
"	*Zenillia blanda* O. S.	Diptera
Somerset.	*Glypta* Sp.	Hymen.
"	*Ephialtes pedalis* Cress.	"
"	*Epiurus* Sp.	"
"	*Apanteles* sp. (near *polychrosidis* Vier)	"
"	*Zenillia blanda* O. S.	Diptera
"	*Phorocera erecta* Fall.	"

The dipterous species *Zenillia blanda* O. S. accounted for just under 3 percent, of the host at both Round Hill and Waterville. The hymenopterous *Glypta* sp. attacked slightly less than 2 percent at Somerset and Round Hill. The

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remaining parasites were obtained in very small numbers, in no instance exceeding 1 percent.

EGG PARASITES

In 1935, an egg parasite was common though not numerous. This parasite was from all indications, the same species as that attacking eggs of *Spilonota ocellana* D. & S., and *Archips rosaceana* Harris in 1927, and then identified as *Trichogramma minutum*.

TABLE II

Percentage of *Eulia Mariana* Fern. eggs parasitized at Somerset, N. S., 1935.

Date	No. of egg masses	Approx. No. of eggs	No. of eggs parasitized	Percentages
June 24	31	1594	97	6+
June 28	40	1789	15	1—

PREDATORS

The most important predator was a species of pentatomid, both the nymphs and adults feeding freely on the larvae. This pentatomid, identified as *Podisus maculiventris* Say, is a common species, but varies in numbers in different seasons It was more common than usual in orchards during 1935. As many as nine adult pentatomids were observed in some larval shelters, and in such instances the infestations of grey banded leaf roller were noticeably reduced. The larvae were always seized at the caudal end and the beak inserted in or near the rear vent, the contents of the body being sucked out until only the outer integument remained. For this operation it was not uncommon for one-half hour to be spent.

Other predacious insects were two hemipterous species, *Deraeocoris fasciolus* Knt. and *Anthocoris musculus* Say. These two predators were frequently observed seizing larvae, but being relatively much smaller than the pentatomids, they seemed unable to capture any larger larvae than those about one-half grown.

I am indebted to Mr. G. Stuart Walley, Entomological Branch, Ottawa, who kindly identified the hymenopterous and hemipterous species, and to Dr. Peck, who identified the diptera.

CONCLUSIONS

From the foregoing, it is apparent that there are many natural factors which are of assistance in the control of this pest. There is a mortality of nearly one-third of the pupae; predacious insects prey on the various stages; and parasites, though not numerous, present a wide variety of species.

Nevertheless all these factors taken together, are not sufficient in preventing the insect from maintaining itself in injurious numbers.

A NEW NORTH AMERICAN AGABUS, WITH NOTES ON OTHER SPECIES. (COLEOPTERA: DYTISCIDAE).

BY HUGH B. LEECH,
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Agabus vancouverensis n. sp.

A species of medium size, elongate-oval, sub-parallel, piceous to rufo-testaceous, usually aenescent. Head large. Antennae and palpi rufo-testaceous, slightly infuscate; clypeus, and labrum anteriorly, rufo-testaceous; two spots on the head rufous; pronotum and elytra with the side margins diffusedly rufo-testaceous in their anterior halves; elytra without pale spots; tarsi, tibiae and femora rufo-tes-

taceous, sometimes clouded with piceous medially, the hind legs darker than the anterior pair. Abdominal sternites three, four and five paler posteriorly.

Male. Length 9.0 mm.; width 4.2 mm. Median antennal segments longer than wide. Surface of the head finely reticulate, the meshes irregular and moderately large; a few very minute punctules within the meshes, and more numerous and larger punctules placed for the most part at the intersections of the reticulating lines. Sculpture of the pronotum similar, the meshes larger, especially laterally where they show a secondary reticulation, and without the course punctules. Elytral sculpture a little larger than that of the pronotal disc; punctules few; secondary reticulations present throughout, especially laterally and apically where they practically obliterate the meshes. Lateral marginal bead of the pronotum very narrow; pronotum not quite as wide at base as base of the elytra, the hind angles well defined and nearly rectangular.

Prosternum very narrow between the front coxae; the process short, broad, very evenly convex, finely margined, polished, sparsely but fairly evenly and minutely punctate; the apex is pointed but not acuminate; the length of the process posterior to the fore coxae, is equal to the width of the prosternum in front of the most anterior part of the fore coxae. Metasternal sulcus very short and rudimentary. Shortest distance between the meso-coxal cavities and the meta-coxal piece slightly more than one third the length of the latter. Hind coxal lines becoming obsolete before they reach the metasternum.

Pro- and mesotarsi very little dilated, clothed beneath with glandular hairs which are flattened apically but lack distinct pallets; hairs on the first segment of the pro-tarsi restricted to the apical fourth, the posterior border of the area oblique. All tarsal claws simple, short, weakly curved; anterior claws of the protarsi slightly broader than their fellows. Mesofemora with a dense mat of long golden hairs arising from a groove along the anterio-dorsal margin. Setigerous patch at the posterior-apical angle of the hind femora very poorly developed, containing only three or four setae; hind femora anteriorly at base distinctly bent downward; hind tibiae with a few coarse serial punctures along the inner margin, the scattered discal punctures more numerous basally.

Male genitalia: Median lobe elongate, strongly curved basally; the apical half almost straight, gradually tapered, laterally compressed. The tip is slightly blunt, and the groove of the ventral (convex) side is narrow. Parameres: as figured; the outer side with a series of parallel, and in part concentric, rugosities; the apical "blade" polished and well differentiated.

Female: Usually with more numerous serial punctures along the inner margin of the hind tibiae. Very often with the pronotum and elytra almost entirely rufo-testaceous, not aenescent.

Holotype: ♂, Vancouver, B. C., June 28, 1931, Hollyburn Ridge, 3,000 feet. (Hugh B. Leech). No. 4218 in the Canadian National Collection, Ottawa.

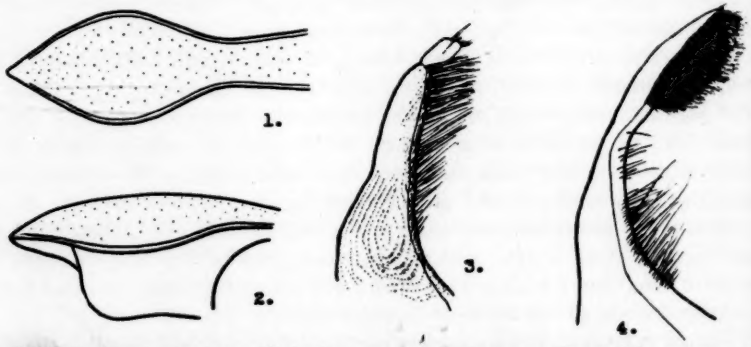
Allotype: ♀, same data. In the Canadian National Collection.

Paratypes: 2♂, 2♀, same data as holotype; 2♂, Vancouver, B. C., July 6, 1930, Seymour Mt., 4,000 feet (Hugh B. Leech); 3♂, same data, August 3, 1930, July 19, 1931, July, 1931; 1♀, Vancouver, B.C., August 9, 1931, Black Mt., 3,500 feet (Hugh B. Leech); 2♂, Paradise Valley, Mt. Rainier, Wash., July 18, 1920 (Van Dyke Collection).

Paratypes will be placed in the following collections: the British Museum, the California Academy of Sciences, and Messrs. R. Hopping, H. C. Fall, J. B. Wallis and the writer.

This species fits best into Group II of Sharp's paper (1882), but not into any of the divisions of Fall's key (1922). The larger size, the short, broad, finely punctate, rather strongly and very evenly convex prosternal process, and the less specialized hind femora, will readily separate this species from *hypomelas* Mann. and *irregularis* Mann., with which it has been confused. A similar dorsal sculpture and weakly modified male tarsi are found in the *confertus* group, but other characters are dissimilar. The shapes of the parameres and median lobe of the aedeagus separate it definitely from the *seriatus* group, in which the median lobe is dorso-ventrally compressed, widely grooved on the ventral (convex) side, and sinuate apically.

This species is fairly common in the mountains around Vancouver, B.C., where it occurs in pools formed by melting snow and ice. Dr. Van Dyke has collected it from snow pools at about 7,000 feet on Mt. Rainier. In addition to the localities cited in the type series, I have examined specimens in the Canadian National Collection from Lion and Grouse mountains on the mainland near Vancouver (R. H. Crystal); and Mt. Arrowsmith on Vancouver Island (J. Fletcher).



Figs. 1 and 2, prosternal process of *Agabus vancouverensis* n. sp. Fig. 3, left paramere of *A. vancouverensis* n. sp. Fig. 4, left paramere of *A. hypomelas* Mann.

Agabus hypomelas Mann.

The description of this species in Mr. Fall's paper (1922, p. 13), is applicable except that in the measurement "Length 6.6 to 8.26 mm.", the latter figure is based on the larger *vancouverensis* Leech. The prosternal process is most like that of *lugens* Lec., but not at all acuminate; it is usually slightly raised along the middle, somewhat variably punctate, more deeply laterally, and in clean specimens a sparse pubescence can be seen to arise from the punctures.

Male genitalia: The median lobe of the aedeagus is testaceous, delicate, strongly curved basally, very much laterally compressed in the apical half, and blunt at the tips. Parameres: as illustrated.

Judging from a series of over forty specimens, the northern range of this species overlaps the southern range of *irregularis* Mann. in the vicinity of Yakutat Bay, Alaska, although I have seen a single example from Katmai.

None has been examined from the type locality (Sitka), but there is a male in Mr. Fall's collection from Scow Bay, which is a short distance south of Petersburg, and not far from Sitka. The species is not rare near Prince Rupert and on the Queen Charlotte Islands of northern coastal B.C., and occurs along the coast to Vancouver. In addition I have seen specimens from Longmire and the lower end of Paradise Valley on Mt. Rainier, Wash. (E. C. Van Dyke Coll.), and from the southern interior of British Columbia, (Waterloo Mine and Erickson).

Agabus irregularis Mann.

A series of over fifty specimens from the Aleutian Islands and points on the Alaskan coast as far south as Yakutat Bay, differ constantly from *hypomelas* Mann.; rather than describe them as new, I am referring them to *irregularis* Mann., which was placed as a synonym of *hypomelas* by Crotch (1873, p. 423). They agree well with Mannerheim's description (1853, p. 159), except that the tarsi could hardly be called piceous. It is possible that the latter condition may have been abnormal in the type; Dr. Van Dyke tells me that the material which Mannerheim studied had been collected many years before, and stored, possibly in alcohol, for a considerable period.

Salient features for the recognition of this species are as follows: Oblong-oval, the sides almost parallel. Length 6.5-7.5 mm. Piceous to almost entirely rufo-ferrugineous; antennae, palpi, labrum and two spots on the vertex rufo-ferrugineous; lateral, and often the anterior and posterior margins of the pronotum, as well as the elytra, broadly diffusely rufo-ferrugineous; tarsi, tibiae and femora rufous, the latter clouded medially with piceous. Palpi and antennae not infuscate. The prosternal process is shorter and somewhat blunter apically than that of *hypomelas;* it is smoothly carinate along the middle, most strongly so in the apical third, thence curving quite strongly toward the body. This gives the process a very characteristic appearance, and might cause the species to be run through Couplet 11 of Fall's key, whence it would trace to *confertus* Lec. which it does not at all resemble; from *verisimilis* Br. and other members of the *confertus* group it can at once be separated by the rectangular hind angles of the pronotum. The male pro- and mesotarsi are very little dilated; hind tibiae with a few course punctures along the inner margin. Aedeagus as in *hypomelas.*

Both *irregularis* and *hypomelas* can be separated from *vancouverensis* by the facts that the antennae are much less slender, and that the mat of long golden hairs along the anterio-dorsal margin of the mesotibiae is very much sparser. In *vancouverensis* the band of punctures along the anterior margin of the pronotum is sparse and limited to a single series at the middle; in the other two species the band is little or not at all interrupted medially. All three species appear to belong to the "*adpressus*-Gruppe" of Zimmermann's discussion of the palaearctic *Agabus* (*Gaurodytes*), (1934, p. 183).

Agabus pseudoconfertus Wallis

This species has recently (Fall 1934, p. 171) been cited as a synonym of *gelidus* Fall (1926). Unfortunately the latter name has already been used as *gelidus* U. Sahlberg (1906), for a species from Finland which, according to Zimmermann (1934, p. 198) is itself a synonym of *infuscatus* Aube. The name *pseudoconfertus* Wallis is available and should be used for our North American

species. Mr. Fall kindly suggested that I publish this note.

Acknowledgements: I wish to express my appreciation to Mr. E. P. Van Duzee and Dr. E. C. Van Dyke for allowing me to study material in the Van Dyke collection at the Californian Academy of Sciences; to Dr. J. McDunnough for the use of specimens from the Canadian National Collection; to Mr. J. B. Wallis of Winnipeg, Man., for the loan of considerable material; to Messrs. R. Hopping and H. C. Fall for loaning specimens from their collections; and to Mr. E. S. Ross for drawing one of the figures.

REFERENCES.

Balfour-Browne, F. 1935. Systematic Notes upon British Aquatic Coleoptera. Part VI. Agabus and Platambus. Ent. Mo. Mag. LXXI, 3rd. ser. No. 241: 7-15.

Crotch, G. R. 1873. Revision of the Dytiscidae of the United States. Trans. Amer. Ent. Soc. IV: 383-424.

Fall, H. C. 1922. A Review of the North American Species of Agabus. Mount Vernon, N.Y. J. D. Sherman. 1-36.

1926. A List of the Coleoptera taken in Alaska and adjacent parts of the Yukon Territory in the summer of 1924. Pan-Pacif. Ent. II: 127-154.

1934. A New Name and other Miscellaneous Notes. Pan-Pacif. Ent. X (4) :171-174.

Mannerheim, C. G. 1843. Beitrag. zur Kaefer-fauna der Aleutischen Inseln, der Inseln Sitkha und Neu-californiens. Bull. Soc. Imp. Nat. Mosc. XVI: 221.

1853. Dritter Nachtrag zur Kaefer- Fauna der Nord- Amerikanischen Laender des Russischen Reiches. Bull. Soc. Imp. Nat. Mosc. XXVI: 159.

Sahlberg, U. 1906 in Medd. Soc. Fn. Fl. Fenn., p. 15.

Sharp, D. 1882. On Aquatic Carnivorous Coleoptera or Dytiscidae. Sci. Trans. Roy. Dub. Soc. (2), II: 179-1003.

Wallis, J. B. 1926. Some New Coleoptera. Can. Ent. LVIII (4) : 89-95.

Zimmermann, A. 1934. Monographie der palaarktischen Dytisciden. V. Colymebetinae. Kol. Rdsch. XX : 138-214.

SOME APHIDS OF THE GENUS CAPITOPHORUS[1].

BY G. F. KNOWLTON AND C. F. SMITH,[2]
Utah Agric. Exp. Station.

The following report deals with the description of one apparently undescribed species from *Artemisia*, and distributional notes on several additional aphid species belonging to the genus *Capitophorus*.

Capitophorus rusticatus n. sp.

Apterous vivipara.—Size 1 to 1.55 mm. long; hairs on vertex 0.034 to 0.049 mm. long and fan-shaped; body hairs 0.017 to 0.034; antennae slightly longer than the body, 1.33 to 1.83 mm. long and dark beyond middle of III; antennal III, 0.28 to 0.4 mm. long and bearing 1 or 2 sensoria; IV, 0.22 to 0.33; V, 0.22 to 0.28; VI, 0.09 to 0.11 + 0.4 to 0.56; rostrum acute, needle-like at tip, attaining third

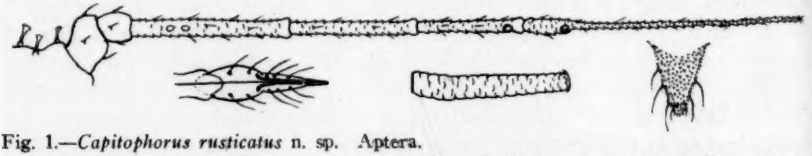


Fig. 1.—*Capitophorus rusticatus* n. sp. Aptera.

coxae; rostral IV plus V, 0.14 to 0.157; legs dusky to dark; hind tibiae 0.77 to 0.94; hind tarsi 0.12 to 0.15; cornicles dusky to dark and 0.29 to 0.42; cauda dusky, 0.14 to 0.17 mm. total length, hard portion 0.12 to 0.15 mm. long and bearing 2 to 3 pairs of lateral hairs and 1 dorsal hair.

[1]Contribution from the Department of Entomology, Utah Agricultural Experiment Station.
[2]Associate Entomologist and former Research Assistant, respectively. Authorized for publication.

Taxonomy.—In Knowlton and Smith's key (Canadian Entomologist 68: 230) this species runs to *Capitophorus quadritrichus* K.-S., from which it differs in having shorter and more nearly fan-shaped hairs on the vertex; cornicles longer than antennal IV or V; shorter cauda, median hard portion being subequal to one half length of cornicles; shorter antennae and more nearly cylindrical cornicles. It differs from *C. pullus* G.-P. in having antennae equal to or longer than the body; hairs on vertex being shorter and more nearly fan-shaped; unguis being 5 times base; body smaller; shorter cauda and rostral IV plus V.

Collections.—On *Artemisia tridentata* at Yellowstone National Park, Wyoming (type locality), July 17, 1936; Rexburg, Idaho, July 14, 1936; Bozeman and Gallatin Valley, Montana, July 16, 1936; Livingston and Fort Ellis, Montana, July 17, 1936 (Knowlton).

Types.—Type slide in the U.S. National Museum; paratypes in the collections of the writers.

Capitophorus braggii (Gill.). Bozeman, September 21, and a male, Gallatin County, October 2, 1932, in Montana (H. Gunderson).

C. elongatus Knlt. Collected upon *Chrysothamnus* in Utah at Beaver, Cove Fort, Hatch, Orton, Scipio, Tropic, and Wild Cat Canyon, north of Beaver, during August of 1936 (Knowlton-Smith).

C. feragaeus K.-S. On *Chrysothamnus* sp. and *C. nauseosus* at Clyde's Peak and Yankee Jim Canyon, Montana, June 11 and 12, 1936 (Smith).

C. fragaefolii (Ckll.). Infesting rose, Bozeman, Montana, July 16, 1936 (Knowlton).

C. glandulosus (Kalt.). On *Artemisia,* usual species *tridentata,* at Mink Creek, Riverdale and Victor, Idaho, July and August, 1936 (Smith); Castleford, Idaho, September 1932 (D. E. Fox); Cove Fort and Sardine Canyon, Utah, August and June of 1936 (Knowlton-Smith); Fort Ellis, Montana, July 17, 1936 (Knowlton); Moran, Wyoming, July 19, 1936 (Knowlton).

C. gregarius Knlt. Infesting *Chrysothamnus nauseosus* in Utah at Green River and Colorado River Gorge, above Moab, July 25, 1935 (Knowlton); Mercur, April 29, 1936 (Knowlton-Smith-M. W. Allen); Mills, August 6, 1936 (Knowlton-Smith); Cottonwood Canyon, August 21, 1925 (Knowlton).

C. magnautensus K.-S. On *Chrysothamnus viscidiflorus,* at Duchesne and Randlett, Utah, July 14, 1927 (Knowlton); Tropic, Orangeville and Huntington, July to September, 1935 (Knowlton). These paratype records were inadvertently omitted from the original description (Canad. Ent. 68: 110).

C. minor (Forbes). On strawberry foliage at Puyallup, Washington, May 15, 1935 (A. J. Hanson); Provo Bench, Utah, July 1934 (Knowlton).

C. oestlundi Knlt. Collected upon *Chrysothamnus nauseosus, parryi,* and sp. at American Fork, Bear River City, Clover, Cove Fort, Enoch, Granite, Green River, Heber, Hobble Creek, Levan, Parowan, Stockton, and Wellsville, in Utah during 1936 (Knowlton-Smith); Montpelier, Idaho, July 19, 1936 (Knowlton); Jackson's Hole, Wyoming, June 10 (Smith) and July 19 (Knowlton) 1936; at Crown Springs, Montana, July 17, 1936 (Knowlton), and Three Forks and Yankey Jim Canyon, June 1936 (Smith).

C. potentillae (Walker). On rose at Amalga in May, and at Hooper in June, 1935 (Knowlton-Smith), in Utah; at Overton, Nevada, June 1935 (Knowlton);

and Bozeman, Montana, July 16, 1936 (Knowlton). Collected on strawberry at Puyallup, Washington, May 15, 1935 (A. J. Hanson).

C. pycnorhysus K.-S. Collected upon *Chrysothamnus viscidiflorus* at Wild Cat Canyon, north of Beaver, August 8, 1936 (Knowlton-Smith), and Wellsville, June 26, 1936 in Utah; Riverdale and Preston, Idaho, June 1936 (Smith); and Immigration Canyon in August 1927; and Logan, Montana, June 10, 1936 (Smith).

C. quadritrichus K.-S. Infesting *Artemisia tridentata* at Cove Fort, Garland, Kanab, Spring City, and Tropic, in Utah during August 1936 (Knowlton-Smith).

C. ribis (L.). On red currant leaves, Kanab, Utah, August 10, 1936 (Knowlton); Bozeman, June 21, 1932 (H. Gunderson) and Billings, Montana.

C. utahensis P.-K. On *Chrysothamnus viscidiflorus* in Dixie National Forest, August 10, and Wild Cat Canyon, August 8, 1936 (Knowlton-Smith); Nioche, June 28, 1927 (Knowlton), in Utah.

C. xanthii (Oest.). Infesting *Xanthium canadensis* at Moab, July 29, 1932, and Santa Clara in Utah (Knowlton); Twin Falls, Idaho (D. E. Fox); Overton, Nevada, June 1935 (Knowlton).

C. zoomontanus K.-S. Sometimes abundant upon *Artemisia tridentata* and *A. filifoliae;* collected at Levan, Utah, August 7, 1936 (Knowlton-Smith); Geneva and Montpelier, Idaho, July 19, 1936 (Knowlton); and at Jackson, Moran, Smoot, and at several points in Yellowstone National Park, July 17 to 19, 1936 (Knowlton).

UNDESCRIBED SPECIES AND VARIETIES OF LEPIDOPTERA.*

BY J. McDUNNOUGH,
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ARCTIIDAE

Apantesis gibsoni n. sp.

It has long been known that the species figured by A. Gibson under the name *incorrupta* Hy. Edw. in his excellent paper on Canadian *Apantesis* species (1903, Can. Ent. XXXV, p. 145, Pl.) is not the true *incorrupta,* which is a synonym of *geneura* Stkr. (1916, B. & McD. Contrib. III (3), 158). As there is apparently no name available for our Canadian prairie species I propose the above one in honor of one of the pioneer workers in this group in Canada. The *holotype* ♂, No. 4209 in the Canadian National Collection (Calgary, Alta. Aug. 7, 1902, T. N. Willing) is the middle specimen figured under the name *incorrupta* on the above mentioned plate; the *alloytpe* ♀ (Areola, Sask. Aug. 20, 1901) is the lowest specimen of the three. In view of the excellent figures and the description given on page 145 of the article a further description is unnecessary. As *Paratypes* I have included a series of 20 males from Aweme, Man. collected on various dates in August by N. Criddle over a long period of years; also 1 ♀ from Rounthwaite, Man., July 30, 1905 (L. E. Marmont) bred from a larva feeding on *Castelleja sessiliflora;* further 3 ♂, Calgary, Alta., Aug. 6, 1902 (Wolley-Dod) and 2 ♀, same locality and collector, July 30, 1893, and July 7, 1894. The

*Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa.

species belongs in the *nevadensis* group and is probably most closely allied to *superba* Stretch.

PANTHEINAE

Panthea acronyctoides var. **albosuffusa** var. nov.

In typical *acronyctoides* Wlk., the type ♀ of which is before me, the ground color of primaries is largely suffused with blackish scaling; this form is found in the Quebec Laurentians and adjacent territory. In the present variety the white ground color shows only traces of black sprinkling in the basal and subterminal areas and in consequence the insect presents a much paler appearance with the black cross-lines standing out very prominently. This seems to be the normal form in Nova Scotia.

Holotype—♂, White Point Beach, Queens Co., N. S., Aug. 8 (J. McDunnough); No. 4223 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, Aug. 2.

Paratypes—2♂, same data, July 19, Aug. 2; 1♀, Cape Breton Is., N. S., June 26 (R. E. Balch).

Panthea furcilla var. **pallescens** var. nov.

Thorax and primaries much more suffused with white than is normally the case, corresponding in this respect to the preceding variety.

Holotype—♂, White Point Beach, Queens Co., N. S., July 29 (J. McDunnough); No. 4424 in the Canadian National Collection, Ottawa.

Paratype—♂, Kings Co., N. S., Aug. 15.

AGROTINAE

Euxoa knoxvillea n. sp.

Vestiture of palpi, head and thorax gray-brown with a slight purplish tinge, palpi shaded outwardly with black on basal and second joints, a faint curved black line on collar below apex. Antennae of male rather finely serrate and fasciculate, of female simple. Primaries rather dark gray-brown with slight purplish tinge caused by a fine sprinkling of gray scales over a dark brown base, this sprinkling more obvious in basal half of wing. On costa near base a pair of small dark marks from the inner of which the black basal half line arises, being faintly edged with a paler shade outwardly. T. a. line arising on costa from two dark spots, faintly geminate, the outer line alone being strong, blackish, slightly outwardly oblique and finely edged with a pale shade inwardly, forming a sharp outer angle below costa, angled inwardly on cubitus and then with two equal scallops. Orbicular rather large, prominent, broadly oval, outlined in black except towards costa where it is slightly open, filled with gray scaling; reinform less distinct than orbicular, moderately large, kidney-shaped, the inner edge outlined in black, the filling scarcely paler than the ground-color of wing, with a faint suggestion of a dark spot in lower angle; claviform hardly perceptible as a large arrow-mark, formed by very fine black lines. Median shade very faint, best defined in costal region, angled at base of reniform. T. p. line improminent, outcurved below costa to well beyond reniform, then evenly inwardly oblique to inner margin and strongly dentate on the veins. S. t. line faintly pale, irregular, shaded inwardly, especially at costa by dark brown shades. A fine black crenulate marginal line followed by a light brown shade at base of fringes which are concolorous with the wing and heavily sprinkled with light gray. Secondaries deep smoky-brown,

the basal half in the male dirty whitish, in the female with scarcely any diminution of the dark shade. Fringes smoky basally, whitish outwardly with light brown basal line. Beneath primaries smoky, pale along costal and inner margins with traces of a curved dark postmedian line and a faint discal spot. Fringes as above. Secondaries whitish in basal half, well-sprinkled with brown along costa with a broad smoky brown outer band, bordered inwardly by a faint post-median line; discal dash distinct. Fringes as above. Expanse 38-40 mm.

Holotype— ♀, Knoxville, Tenn., May 30, 1930; No. 4210 in the Canadian National Collection, Ottawa.

Allotype— ♂, same locality, June 7, 1932.

Paratypes—3 ♂, 2 ♀, same locality, June 2, 10, 26. One pair of these in the United States National Museum.

It is rather surprising that this species has not been noted before and I can only surmise that it has either been confused with *messoria* or that it is rather local in distribution. My small series has been gradually brought together from material submitted for determination by W. W. Stanley of the Experiment Station of the University of Tennessee. Correspondence with Mr. Gates Clarke of the United States National Museum has elicited the fact that the species is not represented at Washington. It is a rather stout, chunky looking insect, with broader fore-wings than in *messoria;* it differs also from this species in the more even nature of the t. a. line, the evenly oval and strongly outlined orbicular, and the darker hindwings in both sexes; there are also minor differences in the male genitalia (fig. 1). I have selected the female as Holotype on account of the better condition of the specimen.

HADENINAE

Scotogramma oaklandiae n. sp.

Allied to *S. crotchi* Grt. in structure of front and male genitalia but closer in maculation to dark specimens of *S. trifolii*. Male antennae finely fasciculate. Palpi roughly hairy beneath, ochreous with black scaling outwardly. Front without the smooth-scaled prominence of the *trifolii* group, with tuft of rough ochreous hair, intermingled with black. Vestiture of thorax rather rough-scaled, ochreous-brown, intermingled with black, forming a dark subapical line across collar and scattered streaks on patagia. Primaries ochreous-brown with black geminate subbasal, t. a. and t. p. lines much as in *trifolii;* orbicular narrowly oval, oblique, pale-filled, with only a faint black defining line, claviform more or less black-filled, reniform rather obscure, partially outlined in light ochreous, broadened basally, with traces of blackish filling in this region. T. p. line rather improminent, the pale filling being more in evidence than the black lines themselves. S. t. line pale, forming a broad, prominent W-mark on veins 3 and 4, preceded by black sagittate dashes as in *trifolii*. Terminal space shaded with smoky. A terminal series of intravenular triangular black spots. Fringe smoky, shaded outwardly with ochreous and with a fine pale basal hair-line. Secondaries pale brownish with a broad terminal band of deep smoky; veins outlined in smoky; discal dash large, angled, rather obscure; fringes smoky basally, pale outwardly, with pale ochreous basal line. Primaries beneath very pale brownish, sprinkled rather broadly with pale gray scaling along outer margin; a prominent dark discal mark,

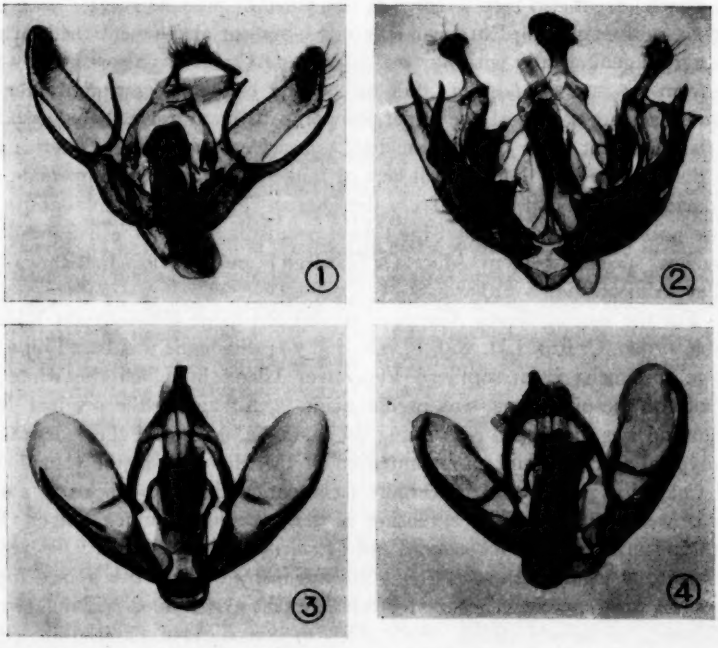
traces of a dark postmedian line, most prominent at costa where it forms a slight angle; bases of veins streaked with dark beyond cell. Secondaries much the color of primaries, a very prominent, angled, blackish, discal dash, a curved dark postmedian line, emphasized by short black streaks on the veins; traces of a dark terminal band, most prominent towards anal angle. Fringes as above. In the ♀ a fine dark dash extends from base of wing almost to the discal streak as in *crotchi* and *chunka*. Expanse 33-35 mm.

Holotype— ♂, Oakland, Calif., Mar. 25, 1908 (G. R. Pilate) ex Coll. Wolley-Dod, No. 4211 in the Canadian National Collection, Ottawa.

Allotype— ♀, same data, July 18.

Paratype—1 ♀, same data, Apr. 22.

In the ♀ Paratype the claviform is larger and prominently black-filled and the W-mark of the s. t. line is lacking; this would appear to be merely individual variations as in other respects the specimen agrees with the Allotype. The distinctive features of the male genitalia (fig. 2) should be recognized from the figure.



Male genitalia of 1. *Euxoa knoxvillea* n. sp.; 2. *Scotogramma oaklandiae* n. sp.; 3. *Eulype hastata* Linn. (Hedley, B. C.); 4. *Eulype albodecorata* var. *confusa* var. nov. (Waterton, Alta.).

GEOMETRINAE

Genus *Eulype* Hbn. A study of a number of genitalic slides has revealed that there are two closely allied species in North America in the *hastata* group, very difficult to separate except on genitalic characters. Not only do these two species range across the continent, occurring frequently in the same localities, but they

also show similar degrees of variation in wing-pattern, thus adding considerably to the difficulties of correct determination. Fortunately in the male genitalia excellent characters for separation are found and these can be recognized with a little practice by simply removing a few scales from the end of the abdomen. In typical *hastata* Linn. as figured in Pierce's Genitalia of British Geometridae (Pl. 33) the sacculus extension consists of a straight pointed rod, extending along the ventral edge of the clasper for about two-thirds its length and *terminating well before the apex;* the aedeagus is armed with *two stout spines* (fig. 3). Typical *hastata* as figured by Prout in Vol. IV of Seitz Macrolepidoptera of the World (Pl. 10, d) seems to be more or less confined to the Pacific slope and adjacent areas; it is before me from various localities on southern Vancouver Island and low altitudes in interior British Columbia; we also possess a few specimens from Alberta (Waterton, Calgary, Banff). Further north on Vancouver Island (Ucluelet) and in the Yukon territory (Dawson) we find forms approaching *subhastata* Nolc. as figured in the above mentioned work, and long series from Labrador, the north shore of the Gulf of St. Lawrence (Harrington Harbor, Little Mecatina Island, etc.) and odd specimens from Nova Scotia (S. Milford, White Point Beach) seem also best referred to this form or possible race; I have had no opportunity of examining European specimens, but our above mentioned series certainly agrees genitalically with *hastata. Gothicata* Gn. seems also correctly placed as a form or race of *hastata,* judging by the original description; the large size and maculate nature of the underside point distinctly toward this association. It is the dominant form in the Canadian zone of eastern North America and is easily distinguished by the practical lack of white banding on the upperside of the secondaries. Besides specimens from the Ottawa region and other Ontario localities we possess long series from the Gaspe peninsula and southern Labrador and also a few specimens from Alberta (Nordegg) and interior British Columbia (Hedley, Ainsworth).

For the second North American species the name *albodecorata* Blkmre. is available (1920, C. Ent. LII, 269, Pl. IX, fig. 7); this name was based on a series of large specimens from southern Vancouver Island in which the white color, especially on the hindwings, was predominant. Although in the original description nothing was mentioned concerning the genitalia, a slide of these organs from a topotypical specimen and an examination of the Holotype in the Canadian National Collection proves that Blackmore's contention that the species was a good one was well founded. The extension of the sacculus is much longer than in *hastata* and is *curved partly around the apical end of the clasper;* the aedeagus furthermore is armed with a *cluster of cornuti* instead of the two spines found in *hastata;* the first mentioned character can be easily determined without removing the abdomen, as already stated. As a study of considerable material showed that this species is as wide-spread as *hastata* and is subject to just as much variation of wing-pattern, it seems advisable to name the two most striking variations, corresponding respectively to the varieties *subhastata* and *gothicata* of *hastata.*

Eulype albodecorata var. **confusa** var. nov.

Rather smaller in size than the nimotypical form, the wing expanse ranging from 29 mm. (holotype ♂) to 25 mm. (small mountain form). Characterized by an extension of the black suffusion in the basal half and terminal area of both

wings and the consequent narrowing of the postmedian white band in which the black row of dots is well-defined.

Holotype— ♂, Hedley, B. C., July 10, 1923 (C. B. Garrett); No. 4221 in the Canadian National Collection, Ottawa.

Allotype— ♀, same data.

Paratypes—1 ♂, same data, July 6; 1 ♂, Lihumption Park, Cultus Lake, B. C., Aug. 4, 1927, (C. H. Young); 1 ♂, Metlakatla, B. C., May 21, (G. H. Keene); 1 ♂, Dawson, Yukon T. (Treadgold); 1 ♀, Summerland, B. C., July 14, 1935 (A. N. Gartrell); 1 ♂, Nordegg, Alta., June 15, 1921 (J. McDunnough); 1 ♂, Waterton Lakes, Alta., June 27, 1923 (J. McDunnough); 1 ♂, same locality, June 26, 1929 (J. H. Pepper); 1 ♂, Banff, Alta., June 13, 1922 (C. B. Garrett); 1 ♂, Hardisty Island, Gt. Slave Lake, N. W. T.. June 5, 1924 (J. Russell); 1 ♀, Blairmore, Alta., June 23, 1920 (J. H. Pepper).

Besides the above type lot a series of rather small specimens from the Hope Mts., B. C., 6,000 ft. and adjacent mountain regions is before me; these show, especially in the maculation of the hindwings, transitional forms to *albodecorata*. Of the type series the darkest specimen is the one from Hardisty Island with basal half of secondaries almost solidly black and the lightest, and at the same time the largest, the female from Blairmore, Alta. which on the hindwings shows scarcely more basal black suffusion than in *albodecorata*. I can find no absolute characters, apart from genitalia, (fig. 4) which would separate *confusa* from our series of *subhastata*.

Eulype albodecorata var. **stygiata** var. nov.

Characterized by the smaller size as compared with that of *gothicata* (25 mm. wing expanse, holotype) and the great extent of black suffusion, leaving on the primaries, an angulate white postmedian band with black median dots and the merest traces of white shadings basally and terminally; the hindwings are almost entirely black with, at times, traces of white streaks above anal angle; the fringes may be checkered black and white or entirely blackish. On the underside of hindwings there is only the faintest trace (generally) of the white median band which in *gothicata* is mostly fairly well-developed.

Holotype— ♂, Mt. Lyall, Gaspe Co., Que., June 27, 1933 (W. J. Brown): No. 4222 in the Canadian National Collection, Ottawa.

Allotype— ♀, same data.

Paratypes—1 ♂, Mt. Lyall, Que., July 13 (W. J. Brown); 1 ♂, Cascapedia, Que., July 1, 1932 (C. C. Smith); 1 ♀, Cascapedia, Que., June 22, 1933 (W. J. Brown); 1 ♂, Kearney, Ont., June 19, 1926 (F. P. Ide); 2 ♂, 1 ♀, Smoky Falls, Mattagami Riv. Ont., June 23, July 1, July 4 (G. S. Walley); 1 ♀, Ottawa, Ont., June 30; 1 ♂, 1 ♀, Aweme, Man., June 11, July 8 (N. Criddle); 2 ♂, Nordegg, Alta., June 14, 18, 1921 (J. McDunnough); 1 ♂, 1 ♀, Hamilton Inlet, Labr. July 12, 1933 (W. W. Perrett); 1 ♂, Lewisporte, Newfoundland, June 25 (D. Jeness).

This variety, the almost exact counterpart of *gothicata*, can only be satisfactorily separated (like the preceding) on genitalic characters. The points of distinction mentioned above may or may not hold good when long series are studied.

DESCRIPTIONS OF SOME GENERA AND SPECIES OF LEIODIDAE (COLEOPTERA).*

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The following descriptions and notes apply to those North American *Leiodidae* in which the mesosternum is vertical between the middle coxae and in which the anterior and middle tarsi are five-segmented and the posterior tarsi four-segmented in both sexes.

The fifteen species concerned possess important characters in common and must be associated in classification, but they exhibit also diversity of structure which requires that they be arranged in several genera. These differences, found in the mesosternum, antennae, the under side of the head, and the male genitalia, may be used in the *Leiodidae* to define strongly characterized groups of allied species and are therefore of generic significance. The presence or absence of antennal grooves on the under side of the head is an important character in the genera described below. In the genera possessing them, the grooves are well developed and each is limited on its outer side by a distinct ridge behind the eye. In genera lacking grooves, the region between the mouth and eye on each side may be very feebly concave, but there is no limiting ridge externally. In the *Leiodidae*, the male genitalia show generic and specific differences as they do in the *Catopidae* and are very useful aids in evaluating other characters and in identifying species in difficult groups. The secondary sexual characters are worthy of special note. In the species described below, the anterior and middle tarsi are a trifle stouter and are squamulose beneath in the males. These tarsal characters do not vary within the species. Other male characters are more or less heterogonic, frequently strongly so, the curvature of the middle tibia and the size of the tooth of the posterior femur increasing relatively with increase in absolute size of the body. In *Neocyrtusa*, appreciation of the specific differences that do occur in some cases in the form of the femoral tooth is usually made difficult by great variation due to heterogony. In the specimens at hand, I note strong heterogony in *Neocyrtusa obsoleta, secreta,* and *potens* and in *Isoplastus fossor*, and little or none in *Neocyrtusa superans* and *insolita*, in *Cyrtusa luggeri, Caenocyrta picipennis, Apheloplastus egenus,* and *Lionothus ulkei*. Similar heterogony may be observed in other genera of *Leiodidae*. I have not observed the sexual differences in the segmentation of the abdomen attributed to our *Leiodidae* by some authors. In the species described below, six abdominal segments may be observed in both sexes.

The species considered here include those which have been placed by recent authors in *Anogdus, Cyrtusa,* and *Isoplastus*, as well as several which have been placed in *Anisotoma* and *Leiodes*. As arranged below, the content of *Isoplastus* is unchanged. A new genus is erected for *Pallodes obsoletus* Melsh. (=*Anisotoma obsoleta* of most authors) with which are associated several closely allied species described in *Anisotoma, Leiodes potens* Brown, *Cyrtusa blandissima* Zimm., and *Cyrtusa superans* Fall. A new genus is erected for *Cyrtusa egena*

*Contribution from the Division of Systematic Etomology, Etomological Branch, Department of Agriculture, Ottawa.

Lec., another for *Amphicyllis picipennis* Lec. (=*Cyrtusa picipennis* of authors), and a third for the species incorrectly identified as *Cyrtusa blandissima* Zimm. by Horn. *Anogdus luggeri* Hatch is transferred to *Cyrtusa*. These changes are necessitated largely by the diverse characters of the species which have been placed in *Cyrtusa*. As constituted in the Leng catalogue, the genus includes species with and without antennal grooves, with and without the mesosternal carina, with ten-and with eleven-segmented antennae. The exotic species which are placed in the genus are in need of considerable revision. The European *Cyrtusa pauxilla* Schm. is very closely allied to our *C. luggeri*. We have specimens from Silesia which represent a species of *Caenocyrta* closely allied to our *picipennis*. The European *Cyrtusa latipes* Er., the species described and figured by Champion (1925, Ent. Mo. Mag. LXI, 6), and *Zeadolopus spinipes* Broun evidently fall in or near the genus *Apheloplastus* which is described below.

I have been unable to obtain specimens of the European *subtestacea* Gyll., the type species of *Cyrtusa*, but I do not doubt that *luggeri* Hatch is congeneric with it. In the original description (1813, Ins. Suec. III, 707), Gyllenhal states that the antennal club of *subtestacea* is five-segmented. Schmidt, redescribing original examples of the species, states that the second segment of the antennal club is reduced in size (1841, Germar Zeit. Ent. III, 189). Thomson who knew *subtestacea*, describes *Cyrtusa* as having the second segment of the five-segmented antennal club reduced in size, the mesosternum without a carina, and the head without antennal grooves (1862, Skand. Col. IV, 42). Of our species, only *luggeri* satisfies Thomson's description.

Authors usually arrange the North American and European *Leiodidae* in two tribes characterized by the presence or absence of antennal grooves on the under side of the head. Such an arrangement divides the genera considered below which are obviously allied among themselves. Moreover, the genera which possess them show grooves of several types. I can see no reason for giving the character such weight. A satisfactory and apparently natural arrangement is obtained by placing in the Leiodini the genera in which the tarsi are similarly segmented in the sexes and restricting the Agathidini to those in which the tarsal segmentation is dissimilar in the sexes. Horn was incorrect in describing *Isoplastus* as having the middle tarsi four-segmented in the female, for the anterior and middle tarsi are five-segmented and the posterior four-segmented in both sexes. Male specimens of *Agathidium* and *Anisotoma* have the vertical mesosternum and the tarsal formula of the genera described below but may be distinguished readily by a number of important characters. In these genera, the labrum is rounded or subtruncate at apex, and the anterior tibiae are not supplied with tarsal grooves. In the genera considered here, the labrum is bilobed, and each anterior tibia is supplied with a well defined tarsal groove.

I have examined the genitalia of the holotype of each new species described below and of *Neocyrtusa potens* Brown and have studied but have not dissected the types of all other species except when otherwise noted. I have examined also, in each species represented in our collection, the genitalia of males from each of the localities. The species described below possess the following characters.

Body red or yellow, broad, moderately to strongly convex, broadly and similarly rounded anteriorly and posteriorly. Head finely, not densely punctate,

without groups of coarse punctures; the frontal suture not evident; the labrum bilobed. Antenna with the first and second segments elongate, stout; the third segment narrower, longer than wide; segments four, five and six not longer than wide; the remaining segments transverse. Pronotum punctate like the head; feebly and broadly emarginate at apex; the anterior angles broadly rounded; the lateral and basal margins moderately arcuate, the latter feebly sinuate before the angles, without a trace of a marginal line; the posterior angles defined but obtuse. Each elytron with nine striae, the ninth marginal throughout its length; the striae not or feebly impressed, closely and distinctly punctate; the intervals not convex; the humeral angle rounded but rectangular.

Prosternum very short, linear before and behind the coxae and cariniform between them. Mesosternum vertical between the middle coxae. Abdomen of six segments, the sixth distinct except in *Neocyrtusa*. Anterior tibia fossorial, supplied with a well defined tarsal groove; all tibiae with numerous strong spines on their outer sides. Anterior and middle tarsi five-segmented and the posterior tarsi four-segmented in both sexes.

Male. Anterior and middle tarsi a little stouter, squamulose beneath. Middle tibia arcuate and with the inner apical angle produced or straight and with the apex truncate; the longer spur modified in *Lionothus*. Lower condyle of posterior femur more or less modified. Aedeagus with the median orifice very large, apical; each lateral lobe with two hairs at apex.

Female. Anterior and middle tarsi slender, with a few simple hairs beneath. Middle tibia straight, truncate at apex. Posterior femur with the lower condyle rounded or obtusely subangulate at apex.

KEY TO GENERA

1. Mesosternum with a distinct median carina; head beneath without antennal grooves; prosternum not carinate before the coxae 2
   Mesosternum not carinate 3
2. Antennae of eleven segments, the eighth reduced but evident; the club more elongate, of five segments; middle tibiae arcuate in the male ..... 1. *Neocyrtusa* n. g.
   Antenna of ten segments; the club very stout, of four large segments .... 2. *Anogdus* Lec.
3. Head beneath without antennal grooves; prosternum strongly carinate before the coxae; antenna of eleven segments but apparently of ten segments and the club apparently of four segments, the eighth segment strongly reduced and indistinct or invisible in dried specimens; middle tibiae arcuate in the male ..... 4. *Cyrtusa* Er.
   Head with antennal grooves beneath 4
4. Antenna of eleven segments, its club of five segments, the eighth segment reduced but quite evident; prosternum not carinate before the coxae; middle tibiae straight .....3. *Lionothus* n. g.
   Antenna of ten segments, the eighth not reduced 5
5. Middle and posterior tibiae very broad, broader than the anterior tibiae; middle and posterior tarsi broad, compressed; the middle tibiae straight 6
   Tibiae slender and elongate; the tarsi very slender, cylindrical; antennal club

of four segments; middle tibiae arcuate in the male .... 5. *Caenocyrta* n.g.

6. Antennal club of four segments ..... 6. *Apheloplastus* n. g.
Antennal club of three segments ..... 7. *Isoplastus* Horn.

1. **Neocyrtusa** n. gen.

Body and appendages red or reddish-yellow, the body moderately convex, its greatest width equal to two-thirds its length. Head three-fifths as wide as the pronotum, without antennal grooves beneath, very finely and not closely punctate. Antennae of eleven segments, the second segment equal in length to the fourth and fifth united; the club of five segments, stout and moderately compact, equal in length to the stem, the eighth segment strongly reduced in size but distinct. Pronotum three-fifths as long as wide. Elytral intervals sparsely, very finely punctulate. Prosternum not carinate before the coxae. Mesosternum with a distinct median carina. Sixth abdominal segment very small and often scarcely evident. Tibiae moderately stout; the tarsi not compressed.

Male. Anterior and middle tarsi and the posterior femora modified. Middle tibia more or less arcuate and with the inner apical angle more or less produced to form a slender process which may be as long as the longer tibial spur. Aedeagus arcuate; the median lobe cylindrical but usually narrowed at apex, with a ventral process at base, feebly sclerotized dorsally at base, incised dorsally on the median line and ventrally on each side to form three lobes closing the median orifice, the incisions extending to apical third or fourth; lateral lobes flattened, appressed against the sides of the median lobe and virtually attaining the apex of the latter, joined together over the dorsal surface of the median lobe by a very narrow band, not joined ventrally.

Type species—*Pallodes obsoletus* Melsh.

The species of this genus are very closely allied among themselves and in some cases are difficult to distinguish except by the characters of the male genitalia. In addition to those described below, two species which are unknown to me are evidently members of the genus. These are *Anisotoma fusciclava* Fall (1925, Can. Ent. LVII, 311) from Ojai and Pomona, California, and *Anistoma sculpturata* Fall from Flagstaff, Arizona.

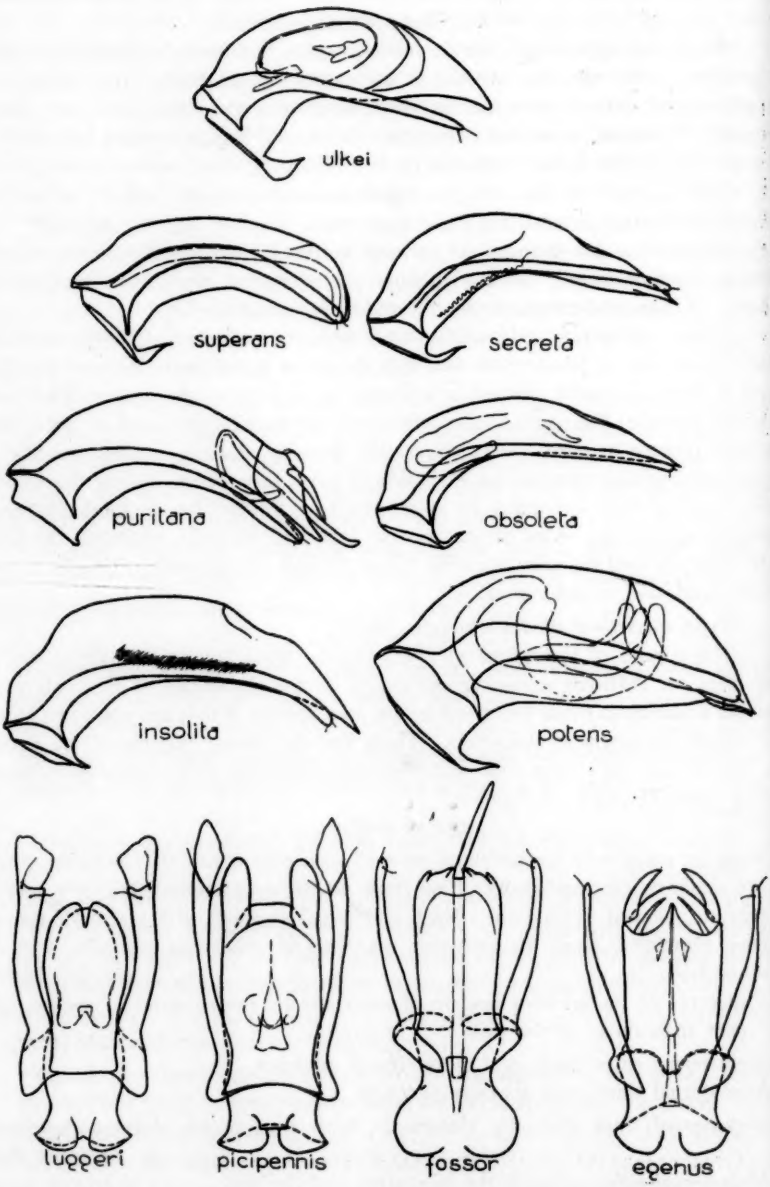
KEY TO SPECIES.

1. Anterior margin of metasternum on each side with a row of punctures which are much coarser and deeper than those of the mestasternal disk; the metasternum polished throughout. Each abdominal segment with a row of coarse, deep punctures along its posterior margin and otherwise virtually without sculpture ..... 1. *obsoleta* Melsh.
Punctures of the anterior margin of metasternum not or scarcely coarser and deeper than those of the disk 2

2. Metasternal sides finely and more closely punctate 4
Metasternal sides more sparsely punctate 3

3. Metasternal sides distinctly alutaceous, with fine, poorly defined punctures ..... 3. *superans* Fall.
Metasternal sides polished, the punctures well defined ..... 2. *secreta* n. sp.

4. Second antennal segment slightly shorter than the third. Posterior femur of male with the lower condyle angulate or toothed at apex .. 5. *potens* Brown.



GENERA AND SPECIES OF LEIODIDAE

Second and third antennal segments equal in length 5

5. Punctures of the metasternal sides less close. Posterior femur of male with the lower condyle angulate at apex ..... 4. *puritana* Fall.
Punctures of the metasternal sides closer. Posterior femur of male broadly rounded at apex ..... 6. *insolita* n. sp.

1. **Neocyrtusa obsoleta** Melsh.

Pallodes obsoletus Melsh, 1844, Proc. Ac. Nat. Sci. Phila. 11, 107.
Cyrtusa blandissima Zimm., 1869, Trans. Am. Ent. Soc. 11, 250.

Length 1.5-2 mm. Second and third antennal segments equal in length. Punctures of the pronotum quite evident, those of the elytral intervals very indistinct. Metasternum not alutaceous, polished throughout; the punctures quite fine at middle, a little coarser on the sides and there close but not dense, well impressed and defined; the anterior margin on each side with a row of much coarser, very deep punctures. Each abdominal segment with a conspicuous row of coarse, deep punctures on its posterior margin and with a row of very indistinct punctules across the middle.

Male. Anterior tarsi feebly enlarged; middle tarsi more strongly so, as stout as the posterior tarsi. Posterior femur, with its hind margin not sinuate before the apex, subacutely angulate at apex in small males, this angle produced posteriorly to form a short, very slender tooth in large examples. Posterior tibia with the inner side rounded. Aedeagus with the median lobe attenuate; each dorsal and the ventral lobe of the median orifice narrowed to a very acute apex; internal sac with a short rod at base and, in dorsal aspect, with a V-shaped piece near the orifice.

The above description is based on males from the District of Columbia. In the Leconte collection, there is the type and another specimen from Pennsylvania and the type of *blandissima* from North Carolina. All of these appear to be females. Horn's figure of the posterior femur, showing the posterior margin sinuate before the apex, is evidently based on some other species.

2. **Neocyrtusa secreta** n. sp.

Male. Length 2.1 mm. Second and third antennal segments equal in length. Punctures of the pronotum evident, those of the elytral intervals very indistinct. Metasternum polished, very indistinctly alutaceous at the lateral margins; the punctures quite fine at middle, slightly coarser on the sides and there well defined and impressed, close but not dense; the punctures of the anterior margin not differing from those of the disk. Each abdominal segment with a basal row of fine punctures, these much finer and less conspicuous than in *obsoleta;* a row of very indistinct punctures across the middle of each segment.

Male characters: Anterior tarsi feebly enlarged; middle tarsi more strongly so, as stout as the posterior pair. Lower condyle of each posterior femur subacutely angulate at apex, the femoral margin feebly sinuate before the angle. Posterior tibia with the inner side rounded. Aedeagus with the median lobe attenuate; each dorsal and the ventral lobe of the median orifice narrowed to a very acute apex; internal sac with a very slender rod as figured.

Holotype—♂, Arnprior, Ont., June 14, 1936, (W. J. Brown); No. 4156 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, June 24, 1934.

Paratypes—6 ♂, 7 ♀, same data, on various dates in June and July, 1935 and 1936.

The paratypes measure from 1.7 to 2.1 mm. The punctures at the bases of the abdominal segments are not or scarcely evident when the abdomen is contracted. The smallest males resemble females so closely that they are readily confused with the latter.

3. **Neocyrtusa superans** Fall.

Cyrtusa superans Fall, 1910, Can. Ent. XLII, 7.

Length 1.7-2.6 mm. Second antennal segment longer than the third. Punctures of the pronotum and elytral intervals quite evident. Metasternum polished and with fine punctures at middle; distinctly dulled on the sides by fine alutaceous sculpture and by fine, well separated, very shallow and poorly defined punctures; the row of punctures on the anterior margin better defined, not coarse. Each abdominal segment closely and very finely punctate, without coarse punctures on the basal margin.

Male. Anterior tarsi very slender, scarcely stouter than in the female. Middle tarsi somewhat dilated, as stout as the posterior pair. Lower condyle of posterior femur with its margin sinuate before the apex; the tooth therefore broad at base, acute at apex. Posterior tibia with the inner side rounded. Aedeagus with the median lobe parallel and cylindrical to apex, the latter truncate; median orifice with each of its lobes broadly rounded at apex and not attenuate; internal sac with a long curved rod as figured.

I have a large series of specimens, including sixteen males, from the Mer Bleue (near Ottawa), Arnprior, Normandale, Ont.; Aweme, Man.; and Manyberries, Alta. The tooth of the male posterior femur varies less in this species than in the others possessing it; in all specimens it is well developed as described above, being only slightly stronger in large than in small individuals. The hind margin of the posterior femur is very indistinctly crenulate in some males.

The type of *superans* is contained in the Blanchard collection at the Museum of Comparative Zoology. I have not examined its aedeagus but associate it with my specimens with confidence.

4. **Neocyrtusa puritana** Fall.

Anisotoma puritana Fall, 1925, Can. Ent. LVII, 310.

Length 2.2 mm. Second and third antennal segments equal in length. Punctures of the pronotum and elytral intervals quite evident. Metasternal sides with very feeble traces of alutaceous sculpture and slightly less closely punctate, otherwise as in *potens*. Abdomen as in *potens*.

Male. Anterior tarsi feebly enlarged, the middle tarsi more strongly so, as stout as the posterior pair. Posterior femur with its hind margin very feebly sinuate before the apex, the latter obtusely angulate. Posterior tibia with its inner side rounded. Median lobe of the aedeagus with its basal process reduced, attenuate apically; the dorsal lobes of the median orifice pointed, the ventral lobe less acutely so and with a very small, V-shaped emargination at apex; the internal sac with a pair of small rods and a long rod curved basally, this armature partially extruded in the figured example.

I have a single example of each sex from Arnprior, Ontario. The types of the species were collected in the vicinity of Tyngsboro, Mass. Through the

kindness of Dr. H. C. Fall, I have been able to examine a male cotype, and although I have not studied its aedeagus, I feel sure that my specimens may be associated with it.

5. **Neocyrtusa potens** Brown.

Leiodes potens Brown, 1932, Can. Ent. LXIV, 205.

Length 2.1-3.1 mm. Second antennal segment shorter than the third. Punctures of the pronotum and elytral intervals distinct. Metasternum not alutaceous, very closely punctate except at middle and on the impunctate area of each side; the punctures on the anterior margin scarcely deeper, not coarser. Each abdominal segment closely, very finely, and rather indistinctly punctate, without coarser punctures on the basal margin.

Male. Anterior tarsi feebly enlarged, the middle tarsi more strongly so, as stout as the posterior pair. Posterior femur with its hind margin not sinuate before the apex, the apical angle obtuse in small specimens, produced posteriorly to form a short, very acute tooth in large examples. Posterior tibia with its inner side rounded. Aedeagus with the median lobe stout, narrowed apically; the dorsal lobes of the median orifice narrowed apically but moderately wide and broadly rounded at apex in dorsal aspect, the ventral lobe of the orifice broadly rounded at apex; internal sac with curved rods as figured.

Thunder River, Que., and Arnprior, Ont.; eight specimens. The hind margin of the posterior femur is crenulate in large males. The angulate condyle of the middle femur, mentioned in the original description of this species, is evidently an abnormal condition. Remounting of the holotype has shown its right middle femur to be rounded at apex as are the middle femora of the other males before me.

(to be continued)

BOOK NOTICE.

A Manual of Entomological Equipment and Methods. Part II. By Alvah Peterson. With 334 pages including 21 plates. Planographed by John S. Swift Co., St. Louis, 1937.

Part I of this Manual was published in 1934 and consisted largely of 138 plates of figures illustrating equipment that has been employed in the study of living insects. It received notice on page 19 of volume LXVII of The Canadian Entomologist. Part II of the Manual is a guide to the information available in the English language on the rearing of insects and other arthropods. It consists of abstracts of the literature concerned and is intended to be complete. In addition, it includes some original contributions on rearing and includes numerous abstracts of papers dealing with the marking of insects, the shipping of living and preserved insects, collecting and photographing insects, and with museum and laboratory methods such as sampling, trapping, preserving, labelling, staining, etc.

The abstracts and original articles are arranged alphabetically by authors. After each author's name follows the date, title of the article, place of publication (of articles abstracted), a subject matter heading, and a concise presentation of

the subject concerned. References are given to drawings which, except for those of the twenty-one plates in Part II, are to be found in Part I of the Manual. The volume is completed by an index which is divided into two parts. The first consists of the scientific and common names of all species mentioned in the Manual, and the second lists equipment and methods relating to rearing and other subject matter.

It will be seen that the present volume supplements Part I of the Manual. The material is presented and indexed in a manner which results in a very usable volume, a volume which should prove very helpful to all entomologists.

W. J. BROWN.

NEWS AND VIEWS

29TH ANNUAL MEETING OF THE QUEBEC SOCIETY FOR THE PROTECTION OF PLANTS.

The meeting was held in Quebec City on May 14th in the Provincial Agricultural Building.

The following papers were presented:—

Nouvelles observations sur la Mouche a scie du Sorbier, *Pristophora geniculata* Htg. ..... Dr. L. Daviault, Berthier.

a) Les Mauvaises Herbes du comte de Bonaventure.
b) Enquete sur l'Herbe a poux en Gaspesie, en 1936. Prof. E. Campagna, Ecole Superieur d'Agriculture de Ste-Anne.

Developments in the Dominion Entomological Service ..... Dr. Arthur Gibson, Dominion Entomologist.

Insects et maladies des legumes d'importance majeure dans la region de Montreal en 1936. ..... E. Lavallee, Montreal.

Mosquito control at the Seigniory Club, 1936. ..... D. Cameron, Montebello.

Origine, distribution et nomenclature de *Carpocapsa pomonella* L. .....Andre A. Beaulieu, Montreal.

The alfalfa Snout Beetle infestation in New York State. ..... L. S. McLaine, Ottawa.

Notes sur le developpement epidemique de *Sclerotinia bifrons* sur peupliers. ..... Dr. R. Pomerleau, Berthierville.

Spider beetles in Eastern Canada ..... H. E. Gray, Ottawa.

Contribution a l'etude de la faune des petits fruits ..... Jos. I. Beaulne, Quebec.

Liste das noms populaires francais des maladies vegetales .. Omer Caron, botaniste provincial, Quebec.

The present situation with regard to White Grubs in Ontario and Quebec. ..... G. Hammond, Ottawa.

Recherches sur les moyens pratiques de detruire les vers blancs Georges Gauthier, Quebec.

a) Catalogue des Uredinalles du Quebec.
b) Gale du collet sur *Lathyrus japonicus.*
c) Gale du *Carya cordiformis* ..... Emile Jacques, Montreal.

A progress report on the Pea Moth investigations in the Gaspe Peninsula. ..... Dr. A. D. Baker, Ottawa.

Commentaires sur le programme d'arrosage des vergers, region de Montreal, en 1937. ..... Fernand Godbout, Montreal.

Anatomie pathologique du chou de Siam cultive dans une solution deficiente en bore. .....R. O. Lachance, Ste. Anne.

L'organisation du nouveau Service de la Protection des Plantes au Ministere de l'Agriculture de Quebec ..... Georges Maheux, Directeur du Service

The host of honour at supper was the Honorable Minister of Agriculture for Quebec, Mr. O. Dussault. The Deputy minister, Mr. Albert Rioux, was also present and previously presented an address of welcome to the members of the Society.

In the evening, S. J. L. Tremblay gave an address, at the University of Laval, on "Le p.h. interieur cellulaire chez les plantes."

Date of Mailing, Sat., July 31st, 1937